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POPULAR MECHANICS

An Illustrated Weekly Review of the Mechanical Press of the World

"Tells you how to do things." Written so you can understand it

Vol. 2. No. 9. CHICAGO, August 30, 1902. PRICE 5 CENTS.

QUEER FREAK OF LIGHTNING IN ILLINOIS

Bolt Strikes Tree, Courses Along Wire Fence and Electrocutes Whole Herd of Cattle a Mile Away

Wholesale Electrocution of Cattle Near Plainfield, Ill.

IN THIS ISSUE:

Cattle Electrocuted by Wire Fence.
Rural Delivery Pays Uncle Sam.
Electric Motors Pound Track Worse Than Steam.
Automatic Device for Lighting Fires.
"Behind the Scenes" in the Chicago Art Institute.
Make Leather Novelties From Human Skin.
Walking Alarm Clocks a New Calling.
Latest Drying Machine for Laundries.
Armor That Will Stop Any Shell.
Youthful Canadian Mechanical Genius.
Shop Notes:—A Cheap Compass—Heat Assists Recovery of Overstrained Steel—Treatment of Burns from Hot Water or Steam—Connecting Pipes With Right and Left Coupling—To Make Celluloid Non-Inflammable—Weight of Air Drill Blow—Wooden Wheels for Vehicles—Repairing a Steam Pipe—Antidote for Ammonia Fumes.
Summer Course in Easy Mechanics:—Building a Canvas Canoe, Part III.

Popular Mechanics can be bought of any newsdealer in the United States.

ENTIRE HERD OF CATTLE KILLED BY CHARGED WIRE FENCE.

Forty-Eight Head Go Down in a Line Together—Current Communicated From Tree a Mile Distant.

Forty-eight head of cattle that were leaning against a barb wire fence in a pasture near Plainfield, Ill., were all electrocuted by a powerful current of electricity that coursed along the wires. The lightning struck a tree to which the wires of the fence were attached, nearly a mile distant and the current was conveyed along the fence to where the cattle were standing. There it left the wires and the cattle received the entire force of the thunderbolt, which had journeyed all the way from the tree. Every one of the animals went down in an instant and fell in a row alongside the fence just as if they had been pierced by a single bullet fired while they stood in line.

Death came to the cattle so quick that it was not observed by any one on the ranch. Long after the storm was over one of the owners was bewildered to find the dead bodies of the entire herd strewn alongside the wire fence. The animals were the property of George Bros. The occurrence has created considerable comment throughout that section of the country, and occasioned much prejudice against the modern wire fence. The wires, some claim, are apt to become charged at any time, when the air is thus burdened with electricity, so as to be dangerous to life and property. It is urged that all such wires should be grounded as a means of avoiding the dangers.

RURAL DELIVERY PAYS UNCLE SAM.

Surprising Success of the System Means That It Shall Be Universally Extended.

When the system of rural free delivery was proposed, the "watch dogs of the treasury" bayed disapprovingly. They claimed it would result in larger deficits than ever in the operation of the postoffice department. Since the system has been installed six years ago the deficit has been growing smaller and for the fiscal year it amounted to only $1,500,000, the smallest in 19 years. For the fiscal year now opening it is believed that this deficit will have been entirely wiped out.

These results have been surprising even to the staunchest advocates of the system which has proved a stimulant to business in the entire postoffice department. The amount of mail going out on the rural routes has almost doubled. The service has been worth many thousands of dollars to the farmers in giving them prompt advices of the fluctuation of prices on the live stock and grain markets. Indeed, the rural free delivery has marked a new era in American farm life. It is no longer an experiment. It is an established improvement that will be extended until its benefits are known to every part of America. Already there are rural carriers distributing 15,000 pieces of mail each month.

SITE OF AN ANCIENT INDIAN CITY FOUND.

The site of the long-looked-for Mascoutens, the largest and most celebrated city in Indian history and the site of the mission of St. James, has been discovered near Governor's bend on the Fox river in Wisconsin. The discovery was made by the Rev. Father Cosgrove of Ripon and Thomas Clithero of Portage, Wis.

The city is reported in 1675 to have had 20,000 inhabitants. It was heard from as early as 1615, was visited by Nicollet in 1634 and by Radisson and Grosellier in 1659. The mission was founded by Allouez in 1669. It is minutely described by Dablon in 1670 and by Marquette on his voyage of discovery with Joliet in 1673.

ELECTRIC MOTORS POUND THE TRACK WORSE THAN STEAM.

Surprising Results of Tests in High Speed in Berlin Upset Old Established Theories.

By Hon. Frank H. Mason, United States Consul General at Berlin, Germany.

In the recent experiments on the Zossen line, the electric motors, conductors and transformers worked to the entire satisfaction of the experts in charge and the maximum practicable speed and the consequent success of the trials were limited only by the track, which gave way rapidly when a speed exceeding 70 miles an hour was attained.

This was indeed the unexpected and a most important fact was brought out by the trials, viz., that an electric motor, as at present constructed, exerts at high speed a greater strain upon the roadbed than a steam locomotive. It had previously been claimed with apparent reason that, being a rotary motor, without the reciprocating motion of pistons and connecting rods, the electric locomotives would avoid the pounding of the track caused by the unbalanced parts and oscillating strain of the steam locomotive. It was therefore a surprise to find that above a certain speed, the strain exerted on the rails by the electric engines was even greater and more fatal. This is now explained by the fact the center of gravity in the electric engine hangs much lower than in the steam machine, and, what is still more important, the whole weight of the steam boilers, cylinders, pilot, etc., is carried on springs while in the electrical engines used at the trials the motors and all the heavier working parts were hung directly upon the axles, thus adding a crushing weight to the blow delivered by the wheels upon the end of each rail. Attempts have since been made to devise a system of springs to avert or lighten this defect but so far as can be learned, with only very limited success.

NEW PAINT STIRS PARIS ART CIRCLES.

The invention of a new paint by the well-known French artist M. Raffaelli, has caused quite a stir in Paris art circles. It is looked on as the first revolutionizing innovation made in art since the Dutch master, Van Eyck, introduced oil painting in the 14th century. Raffaelli's invention consists of paints made in sticks, ready for immediate use, the inner colors being protected by a hardened outer coat, which, when broken through, enables the stick to be applied directly to the canvas as with a crayon. Thus the new process does away entirely with the use of paint brushes and palettes. This is said to prevent inaccuracy in mixing paints caused by having so many different colors on the palette at once; it saves the time of mixing and enables the artist to execute a color he has conceived before the idea has left him as is often the result of delay in mixing paints. It saves the trouble of cleaning afterward and the paints are said to have a peculiar luminosity never before attained.

EXTRACT OIL FROM FISH OFFAL.

Fish oil of good quality and bounteous quantity is extracted from fish offal through a process patented by E. R. Edson of Cleveland, O. The Edson Reduction and Machinery Co. has been organized there to operate the patents and is now supplying competitors with reduction machinery. In the reduction of fish offal a vegetable process is used. The system is somewhat like that employed in separating metals by means of chemicals. By means of steam and compressed air the vegetable matter is reduced to pulp. The last drop of oil in this substance is extracted after which the residue is sold to the farmers.

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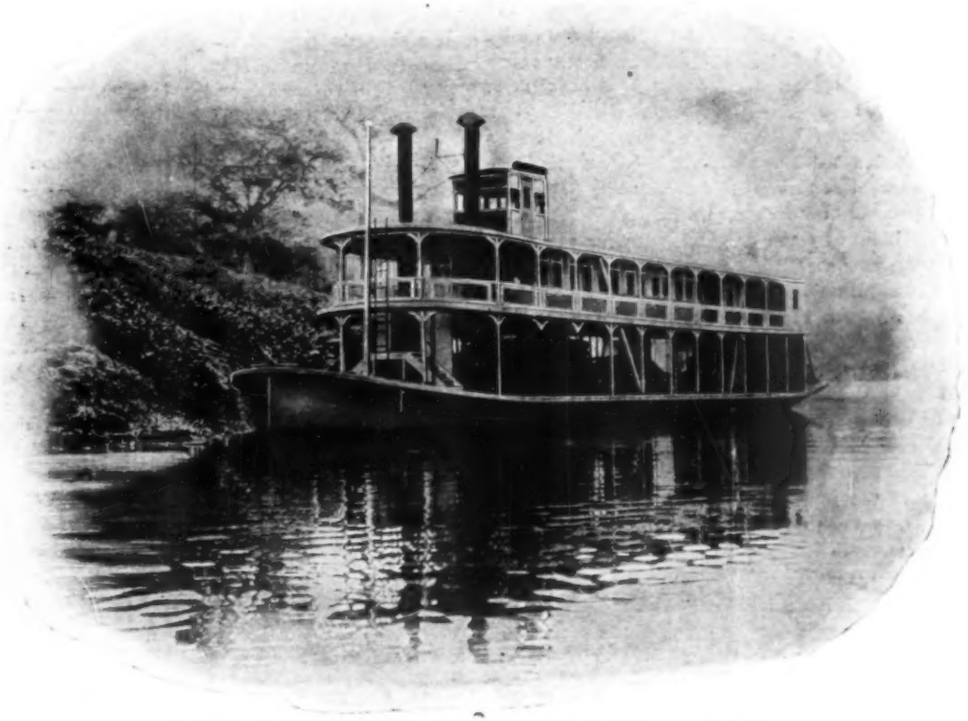
Steamer Built in Chicago--Pieces Shipped on Train to Mexico

Thousands of Parts Numbered and Successfully Put Together on Arrival in the Land of the Moztezumas



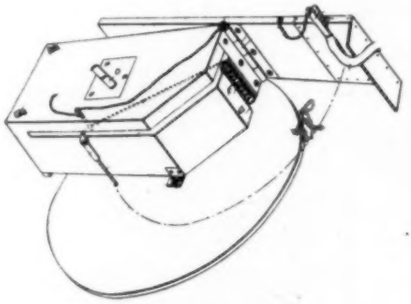
River Steamboat "Dos Rios" on the Coatzacoalcos River, Mexico.

The steamboat shown in the illustration was built in Chicago by the Marine Iron Works, all ready to erect, then the thousands of pieces of boat and machinery, including every nail, screw and bolt; the decorations and paint were boxed and sent on cars to Mexico. On arrival there each piece and part was so numbered that on being assembled each one exactly fitted into its proper place. Then the boat was launched and this photograph taken.

The boat is a stern-wheeler, 111 feet long; beam 22 feet; paddle wheel 12 feet diameter; steam pressure 200 pounds; speed 15 miles an hour.

AUTOMATIC FIRE-LIGHTER.

Some cold morning next winter many of our readers will wish they had something like this machine which contains clockwork which can be set to light a fire at

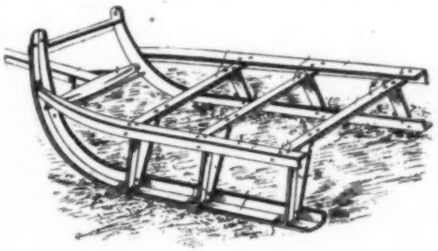


any hour. It is wound and set like an alarm clock, and it placed near the grate or stove to be lighted. At the appointed moment a spring is released which strikes a match and applies it to the kindling.

Popular Mechanics, you know, is the journal that "tells you how to do things." It is getting so that "nearly everybody reads it."

ALL-STEEL SLEIGH.

A very strong type of sleigh for farm and other heavy hauling is now being made



of pieces of L angle-iron, hot riveted. Our illustration shows its construction.

UMBRELLA DRIP CUP.

A detachable cup of metal is now made

to put on the tip of your umbrella to catch its drip. The cup may easily be slipped off and emptied.

SAFETY SWING FOR INFANTS.

A combined cradle and safety swing for small children has been patented by A. C.

Jacobs, of Birmingham, Ala. A mesh of soft rope is fastened to a stout frame, and the frame held by one rope at each corner.

In going up stairs never lean over, so that you contract the chest and bend the whole body forward from the waist. Hold the head erect, the shoulders back and the chest expanded with no bend at the waist line, bring your weight upon the calves of the legs, and you will find stair-climbing good exercise.

MAKE LEATHER NOVELTIES FROM HUMAN SKIN.

Ghoulish Fad of the South Making Its Way to the North—May Become a New Industry.

Gloves, hand bags, belts and watch fobs made of human skin are possessed by many people in the South as curiosities. The articles are nearly all made of negro's skin artistically tanned. Mr. A. H. Lockwood, of Chicago, recently received the following message from Louisville, Ky., inclosed with a most beautiful piece of leather:

"I send you a small piece of leather made from the hide of a Kentucky negro. I tanned some pieces for students and I hope you will accept the piece I send you as a novelty."

Mr. Lockwood, who is an authority on leather, says: "A man's work may live after him, why not his hide. There are some who have been making a great fuss about this pretty work on human skin as if preservation were a crime."

The skin makes a thin but soft and substantial leather. In quality it is nearly equal to kid. There is no difference between the skin of a white person and a negro as far as the quality of the tanned leather is concerned. It is reported that the practice of making articles from human skin is making its way to the North and that the hides of white persons are now serving as pocket books and leather cases. Soon it may be so that our cuticles will live on in the form of slippers to make merry in the dance halls, or may be to protect the "mit" of a prize-fighter, years after the breath has left our bodies.

TO MAKE MOLASSES AT HOME FROM SIRUP CONCRETE.

In the future it may be that every housewife will make her own sirup or molasses. She will buy what is known as "Sirup Concrete," and by adding water will have as fine quality of sirup as is obtained from the finest sugar cane and she will be protected against adulterations. The United States government is now establishing experimental stations in Georgia and Florida with a view of determining as to whether this concrete can be successfully manufactured on a large scale in America. The concrete is obtained by boiling the sirup to a sugar hardness, but retaining in this mass all the flavor and other properties of sirup except its fluidity. By the manufacture of this product fermentation is prevented, there is a distinct saving in the losses attending the boiling of sirup in the usual way, and because of its condensed form transportation charges are, of course, much less than on sirup. All canes will not produce concrete as not all canes will make sugar.

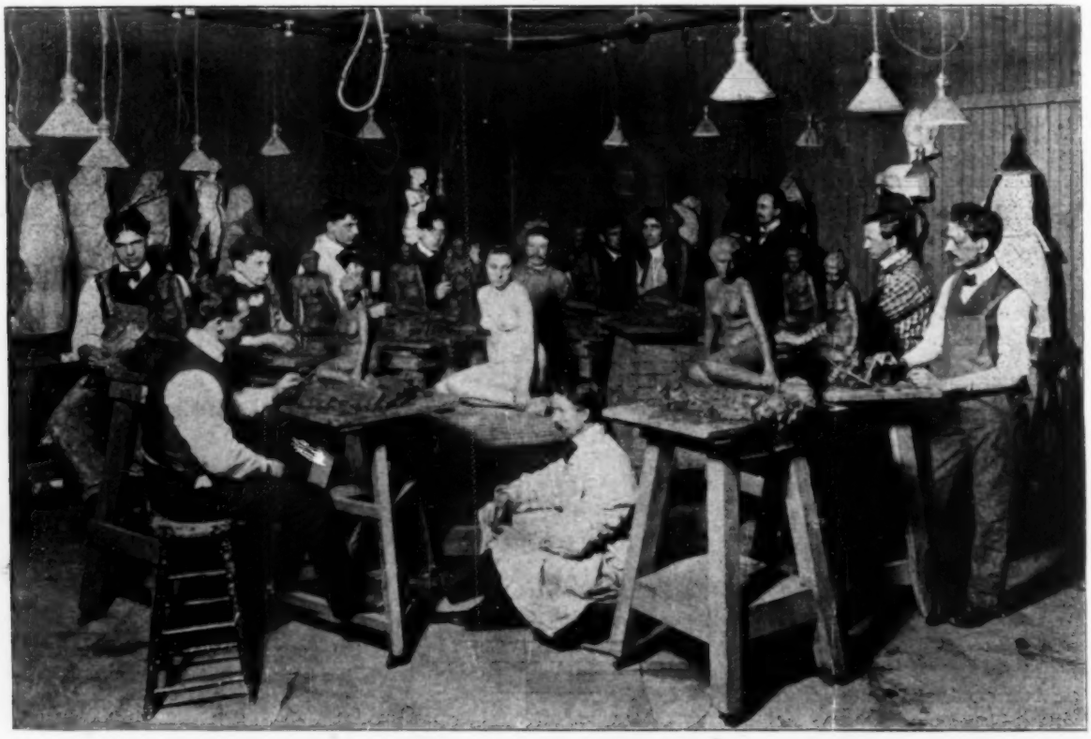
PECULIARITIES OF AN ELECTRIC SHOCK.

An English electrical engineer who has experimented, finds that electric shocks do not affect all persons alike, or the same person always to the same extent. Much depends upon the condition in which the person is at the time. People suffering from kidney trouble are extremely sensitive to electric shock, while idiots and intoxicated persons can take a shock which might prove fatal to others. Shocks received through the limbs on the left side of the body are more severe than on the right side. The effect of a heavy direct current is to knock the person down, while an alternating current seems to draw him closer together. Under 600 volts the conditions must be very favorable to cause death from direct current unless long continued.

"BEHIND THE SCENES" IN THE ART INSTITUTE.

Interesting Part of the Great School Seldom Seen By the Ordinary Visitor.

The casual visitor in his easy stroll through the halls and corridors of the great Art Institute of Chicago often does not realize that beneath his feet are sights more interesting than any he sees while gazing on the graceful curves of the cold marble figures before him. It is in the basement where the living models pose and where young men and women students are busy with the modeling clay that one might find additional reasons for calling the Chicago Art Institute great. But here visitors are



Evening Life Class in Sculpture, Chicago Art Institute, Chas. J. Mulligan, Instructor.

not admitted except on rare occasions such as the entertainment of Minister Wu to Chicago. This basement is called the "behind the scenes" of the Art Institute.

Just now the mechanical work of the clay modeling in this establishment is attracting wide attention. Art instructors at home and from abroad have been outspoken in their praise of the clay figures. Whether this is due to the superior natural talent of the Chicago students or to the perfection of the Chicago models who pose for the students is hard to determine.

Day Life Class in Sculpture, Chicago Art Institute, Lorado Taft, Instructor.

There were 2,339 students enrolled in the Art Institute last year. The accompanying illustrations show two classes in academic modeling at work. The model takes her pose on a central platform and about her are grouped the students who make miniature likenesses in clay. In both the illustrations the students have about completed their clay figures and the model may soon relinquish her tiresome pose, which however easy it may seem in the completed statue, becomes exceedingly painful to the model when she has to remain in one position a long time. Only young women trained in the work make good models. They must be quite perfect in form and have a natural taste for the artistic to make a success. They are paid from $1 to $5 an hour for their services during class hours.

LIGHT PREVENTS WORKING OF WIRELESS TELEGRAPH.

In an address to the Royal Society, London, Marconi announced his discovery of the better working of his system at night than during the day. This applied to long distance work over 500 miles. Under 500 miles no difference was noticeable. At distances of over 700 miles the day signals failed entirely, while the night signals were quite strong up to 1,550 miles, and readable at 2,000 miles. His explanation is that daylight seriously affects and retards the propogation of electromagnetic impulses over long distances. Unless he succeeds in overcoming this cause he may not be able to transmit messages across the Atlantic except at night.

WALKING ALARM CLOCKS A NEW CALLING

Travelers, Banquetters, Society Women and All Drowsy Slumberers Awakened at Appointed Hours.

Human alarm clocks are becoming very popular in Chicago and they have formed the nucleus of an important enterprise. Boys serve as the alarms and their work is on the same principal as that of call boys or "callers" for railroad trainmen. The boys wear uniforms and carry a book which the person who is called is made to sign. They are sent out from a central office, each boy having a certain number of persons in a given locality to awake at certain hours.

The duty of these "walking alarm clocks" is varied and often adventurous. Maybe at an early morning hour a banquetter will stroll into the central office in his dress suit and rumpled silk hat and ask to be called in time to go to his office the next morning. The traveling man who has been overindulgent may want to rest a few hours before catching a midnight flier. Often the society woman who has been out late to a cotillion or wine supper and who predicts a drowsy slumber, will want to be awakened by the call boy before her hostess sends the servant, for obvious reasons.

"Get away from my door," said a man who had staggered into the central office the night before and left a call for 8 o'clock. "You are at the wrong place. I don't want to get up."

"Oh, yes, you do, my dodo bird," is the fresh reply and the banging on the door continues with redoubled strength. There are curses and threats but the youth continues until the man comes to the door and signs the book, which signature certifies that he has been thoroughly awakened by Messenger No. 126 and that he is not going to bed again that day.

Health Officer Friederich of Cleveland, O., has begun a war on dirty money. He claims that many cases of small-pox and other contagious diseases can be traced to this money in its path from one person to another.

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TIME IS MONEY THESE DAYS.

President E. J. Buffington, of the Illinois Steel Company, declares that the day of petty economies has passed. "A man advertises for an office boy," he says. "His choice finally rests between two bright youngsters, and as the supreme test he asks that they open packages lying on the table. This is easy for Charlie. Charlie takes up a package, unties four hard knots, unwinds the string, rolls it up around his finger, ties it in a loop, and lays the string in a safe place. Then, unwrapping the package, he folds the paper up neatly and lays it on a shelf. By that time Willie with his pocket knife, has slashed the strings on seven packages, ripped the paper off and piled the whole mass of rubbish in the waste basket. Forty years ago, of course, Charlie would have got the job; now, however, Willie is business manager for the house. Small economies must be scientific economies now-a-days. The days of saving wrapping-paper and twine are gone."

COLLEGE DEGREES FOR CORRESPONDENCE SCHOOL STUDENTS.

The American School of Correspondence has recently made an arrangement whereby the students are admitted to the classes of one of the great resident technical schools without further examination, and their work counts towards a degree of B. S. This shows in a striking manner the wonderful advance in the standard of correspondence work in the past few years, and marks a new era in the educational possibilities of the common people. Ambitious young men who are too poor to give up four years to obtain a college degree can now do part of their work at home, and, in this way, finish with a few years at a resident technical school. In this connection the free scholarship withdrawal announcement of the American school in another column is of great interest, for it ends one of the greatest educational opportunities of the year. The trustees of the American School of Correspondence, Boston, Mass., have been offering a limited number of free scholarships to deserving young men for the purpose of securing a few representative students in the large shops. The school now announces that after September 30th, no more free scholarships will be awarded. This is a wonderful opportunity for a bright young man to get a course in mechanical, steam, textile and sanitary engineering (including heating, ventilation and plumbing) and mechanical drawing. Tuition to successful applicants will be entirely free, the only expense being (as in all schools) for postage and instruction papers.

A postal card addressed to the school will bring any information that may be desired.

LEATHER FOR HOUSEHOLD DECORATIONS.

Revival of An Ancient Style of Wall Facing and Upholstering.

Leather for the facing of walls, the covering of various pieces of furniture and other decorative purposes is being more extensively used now than it has in centuries before. Artistic and substantial the new style of adornment—or rather the revival of a very old style—promises to be exceedingly long lived. With what might be termed the renaissance in household art that began about 25 years since, came a more general appreciation of rich Spanish and English leathers that were found on antique pieces of furniture. As a result leather has become more beautiful. In many instances these leathers are reproduction of the old Cordovan. Many kinds of skin are used, as some are too coarse of grain to become flexible enough to take the finish demanded for certain purposes.

A successful dining room has recently had its walls completely covered with an old yellow leather illuminated with dull gold and bronze. The leather is applied in panels and tacked on with large dull bronze-headed tacks. The frieze is of stamped leather which is a bit more brilliant in tone. Over the mantel is a panel of plain leather, emblazoned with the family crest. The furniture in this room is of old walnut upholstered in the old yellow leather, the coat of arms on the back and seat. The library in this same house is also done in leather, the color being an old dull red. The chairs are covered with embossed leather; the table, a massive affair, is completely encased in leather.

NOVEL AUTOMOBILE EXPERIMENT.

Powerful Electric Searchlight Pierces Darkness Two Miles.

A powerful electric searchlight, mounted on an automobile, dashing along 30 miles an hour, and hurling a dazzling shaft of light for two miles in advance, was the startling sight witnessed in Chicago a few evenings ago. The experiment, which is believed to be the first of its kind, was originated and carried out by Chas. E. Gregory, president of the Guarantee Electric Co. As the auto shot along the effect was that of a huge meteor sliding swiftly along on the ground. Mr. Gregory says:

"I mounted a 5000 c. p. General Electric marine type projector with swivel and trunnion to the front of the automobile and connected in 40 cells of battery giving off a voltage of 92 volts. A variable resistance was used in order to regulate the field and a run of twelve miles was made through the boulevards and parks. The shaft of light was projected for two miles and as the focus was perfect, the lamp seemed to bore a hole twelve inches in diameter right through the darkness. I doubt if this was ever attempted before in the history of automobiling and can assure you it certainly was a novel experience."

The International Harvester Machine Company, it is said, will soon absorb the leading Canadian harvesting machine and implement companies. The company is now capitalized at $120,000,000, and include the following companies: McCormick Harvester Machine Co., Deering Harvester Co., Plano Mfg. Co., Warder, Bushnell & Glessner Co. (Champion), Milwaukee Harvesting Co. Cyrus H. McCormick is president.

Popular Mechanics is the medium for inventors. They find it interesting and helpful.

LATEST DRYING MACHINE FOR LAUNDRIES.

The traveler or other person who sends his soiled shirt to the laundry in the morning and gets it back the same night looking like new, often wonders what are the conditions that make such rapid work possible. He is probably not aware that the modern laundry is entirely a different institution from what it used to be; that in the colossal enterprise of cleansing the linen of the public some of the greatest of modern inventions have been brought into use. One of these late contrivances is shown in the accompanying illustration. It is called the automatic conveyor dry room.

The room is heated by steam coils which almost line the interior walls. At the roof is an automatic fan which in revolving circulates the heat so as to effect its equal distribution. The clothes to be dried are hooked on to the conveyor outside the room. The conveyor is a kind of endless chain which travels horizontally from a frame above. Inside the room the chain, or conveyor, travels back and forth to make the distances as great as possible. Each piece of clothing of course makes the journey through the room in exactly the same length of time. When it completes its spiral windings inside the heated walls and makes its exit from the room the piece is automatically released and falls into the basket shown at the right of the engraving. When the basket is full an electric bell rings and the basket is rolled away. The apparatus is made by Barnes & Erb Co., Philadelphia. As a labor saving device it is unequalled, as the whole process of drying is done entirely by machinery and it saves a wonderful amount of space. This is said to be the most important invention for laundry work in many years.

The Automatic Dryer.

THE BEE STING CURE FOR RHEUMATISM

In Philadelphia the old theory that bee stings will cure rheumatism is being revived and the city is groaning in agony. The physicians are busy applying ointments to swollen limbs and disfigured countenances. William Bradley, a farmer of Shady Grove, heard of the theory and decided to try it. He invited his neighbors to witness the cure. Clad only in a long thin robe he hobbled up to the hives on his crutches, and overturned two of them. The bees at once began to apply the cure with all their characteristic energy. Bradley cried lustily for help. He could not run and his friends not being afflicted with rheumatism did not care to test the "sting" cure. Finally they managed to rescue him by throwing him a rope and dragging him away. The unfortunate man has such a beautiful case of the stings that it will be some time before he knows whether he has been cured of rheumatism. There are many others in Bradley's fix around about Philadelphia.

"Them hosses," said the old farmer, "is the best matched team I ever see. One is willin' to do all the work and t'other is willin' to let him."

TO HANG HER FATHER'S MURDERER.

Mrs. Etta Hall, a beautiful Georgia woman, living in Valdosta, has asked permission to spring the trap that is to hang Boisy Bryant, the negro who murdered her father, the late Marshal W. A. Hires.

Headache sufferers should never sleep with closed windows, winter or summer. Opening the window in the next room won't do. You must have fresh air from outside.

The island of Luzon is rich in gold, according to the claim of John Robinson, a Chicagoan who has recently returned from the Philippines.

SETTING LAVATORY BOWLS.

Lavatory bowls cast in one solid piece in porcelain or enameled iron require quite as careful setting as the old time marble, especially as the marble slabs are seldom perfectly cut. The Metal Worker gives the following suggestions: All bowls should have the face which joins the slag ground so as to bring the whole face in one plane. This keeps the bowl from rocking on the slab,

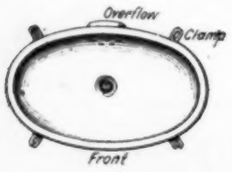


Fig. 1.—Oval Bowl

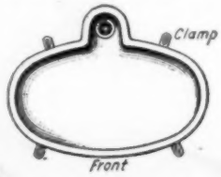


Fig. 2.—Recessed Bowl.

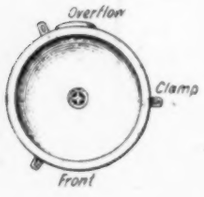


Fig. 3.—Round Bowl.

Fig. 4.—Drilled Slab.

insures a close, neat joint, and the grinding takes the pottery glaze off so that the plaster will adhere.

Bowls should not be set and left where they will get freezing cold. The ground face should be well soaked with water before setting. If this is not done the porous face will take the water out of the plaster so quickly that it cannot be moved without ruining the joint, and it will be difficult to put the bowl down exactly right, even with the guide line and points previously marked on both slab and bowl to work by.

The grade of plaster used by dentists is best; less of it is needed; it adheres better and looks better when finished. It should be mixed to the consistency of cream, poured around the bowl hole inside the guide line and the bowl set carefully on it

Fig. 5.—Angle of Anchor Holes.

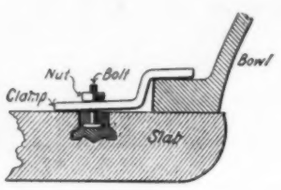


Fig. 6.—Calked Bolt and Clamp Attached.

and pushed down and postled into place quickly. The basin clamps should be screwed down while the plaster is soft and the inside and outside wiped clean. If the slab and bowl fit well a joint 1-16 inch thick is ample, and no overhanging plaster on either side is necessary. Guide lines are made by the marble cutter by scratching around the bowl while it is held properly over the bowl hole. On stock slabs the plumber can make the guide line with a pencil. Any marble works will grind bowls for stock slabs very cheaply. The plumber must determine whether the overflow shall be placed in front or back.

Many kinds of basin clamps are sold. The usual type is cast or stamped with offset to reach over the flange of the bowl and slotted for the bolt. The bolt has a thin, flat square head. It is made of brass. Four clamps should be used on square bowls, and the oval and recessed bowls, shown in Figs. 1 and 2. Three clamps are sufficient for a round bowl, as shown in Fig. 3. In every case they should be placed so as not to come in the way of overflow, brackets, recess or apron. On stock slabs, if the holes are not in the right position, new ones should be drilled. Holes for clamp bolts are usually poorly drilled in stock marble and the anchor holes need to be drilled deeper. Three anchor holes, as shown in Fig. 4, drilled at an angle of 45 degrees, as indicated by Fig. 5, will keep the bolt in place if the lead is poured hot and carefully calked, as in Fig. 6, which also shows the clamp holding the bowl in place.

DELIGHTS OF ENGLISH HOUSEBOATING.

It is a source of regret to those who have tasted the luxuries of house boating in England that such recreation is not more popular in America, where even better opportunities are afforded than in the old country. The house boats along the Thames are the creation of those who love easy living in the summer time. There are no structures that are planned so perfectly for comfort as these same house boats. They are of all sizes, from the one that is just big enough for the newly married couple, to the gigantic floating palaces that will entertain an army of guests. They are very graceful in design and in color. In fact, the painter's color box seems to have been ransacked to secure the tints that riot along the banks of the Thames. The boats anchor close to the bank, and a plank is run out to get ashore. At night the plank is hauled in. Some boats have their own power, others hire a tow when a change of location is desired.

The regular program of the house boat is to rise at 6 a. m. and take a plunge and a long swim. After this comes breakfast, spread under the awning on the roof. Then, after a loaf, is a walk in the woods or along some quiet country road. After lunch there is a long easy pull to some quiet and retired nook under the trees that line the bank and an afternoon spent in dozing away the time or else reading the latest novel, while a companion tinkles on a mandolin or twangs a guitar. The evening is spent in visiting each other's boats until about 10 p. m., when every one turns in for the night.

ARMOR THAT WILL STOP ANY SHELL.

Lieut. Cleland Davis, an attache of the naval ordnance bureau, has produced an armor plate which, it is believed, will offset the recent development in high explosive and armor piercing projectiles. The Davis plate was tested at the proving grounds at Bethlehem, and the results encourage the naval officials to believe that the armor plate has again overtaken the gun in the never-ending struggle for supremacy. This plate is obtained by a novel process, carbon being driven directly into the surface of the hot plate by an intensely powerful current of electricity, the result being a face as hard as glass and of the thickness desired, supported by a tough back, which, it is claimed, cannot be cracked. The depth of the hardening is regulated by the length of time the current plays upon the plate. It is claimed that an average plate can be completely treated electrically in five hours. Moreover, the plate is claimed to be a third lighter for the same resisting power, which means a great saving to constructors.

A native hardware man in India advertises as follows: "Haji Noor Bux the ironmunger man of Muttra has all first class goods for sale he has also perambilater for infant and guns for Sahib. His prices is not so as those of English shop and he is the most cheap of all so come and buy some things he sells corigate iron and bark wire at more less than Calcuta fellow can sell."

A three-inch manila rope, 500 feet long, will weigh 1,485 pounds. One wire rope, it is claimed, will outlast three hemp ones.

Evelyn B. Baldwin contemplates leaving Tromsoe, Norway, in the autumn on the first stage of his polar advance.

200,000 MILES OF RAILROAD IN THE UNITED STATES.

The railroads of the United States now aggregate over 200,000 miles, all of which have been built during the past 74 years. Up to 1865 only 32,000 miles had been constructed. Then the first road was chartered in 1822 people were asking "What is a railroad?" and one editor replied he did not know, but "perhaps some correspondent can tell." There are 500,000 miles of railroad in the world, of which this country has two-fifths; Germany, 32,000 miles; Russia, 29,000; France, 27,000; Austria, 23,000; and Great Britain and Ireland, 22,000.

PARIS TO HAVE WIRELESS TELEGRAPH NEWS SERVICE.

A company in Paris is preparing to furnish the news every few minutes during the day and night, to subscribers in that city, using wireless telegraphy as the medium of transmission. A tall mast will be erected at the race course and on race days an automobile with the sending instruments will be sent to the grounds and report every incident as fast as it transpires.

"TOUR DU MONDE" INSTEAD OF MIDWAY.

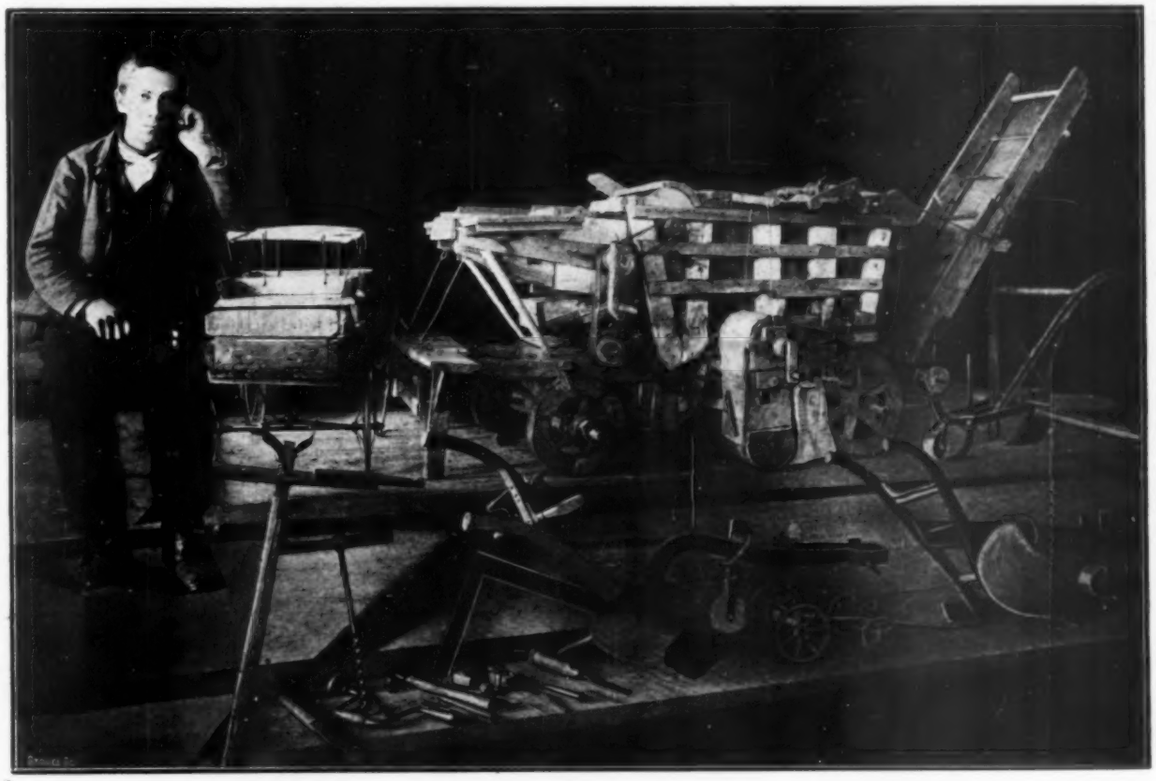
The Midway Plaisance has seen its day. Hereafter at world's fairs instead of "strolling through the Midway," it will be a "Tour du Monde," or a trip around the globe. The idea has been brought forward by Norris B. Gregg, director of concessions of the Louisiana Purchase Exposition and seems to have struck the popular chord. The tour will include a visit to the villages of all the nations which will be arranged on either side of a cosmopolitan thoroughfare that will undoubtedly be the most popular street at the coming World's Fair. One ticket, with stop-over privileges, entitling the holder to a visit at all the villages, may be purchased.

REMARKABLE WORK OF A BOY.

A French-Canadian boy, Master Senoville, of St. Boniface, Manitoba, has accomplished some remarkable work without any mechanical instruction and with only a few tools at his command. The Farm Implement News reprints, from the Nor'-West Farmer, published at Winnipeg, a description of his work.

A threshing machine he has invented can be made to thresh peas and beans. The wooden parts are made out of all sorts of odds and ends picked up about the farm, and the iron parts are constructed from barrel hoops, scraps of iron rods and such other waste material as chanced to be available. The small plows are also evolved from similar sources, and are so well made that they have been used in a small way about the maker's home.

Wonderful in themselves as the products of this boy's work may be, their production becomes a good deal more marvelous when the meager character of his tools is considered. Not having a set of tools to work with, he set himself to make a small forge and constructed his own chisels, tongs and other instruments.



A Young French-Canadian Implement Maker—Master Senaville and Some of His Work.

ATTACHMENT FOR MILK PAILS.

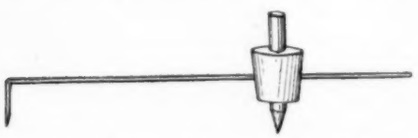
C. S. Crow, of Frendale, Iowa, has patented a bottom for milk pails, which fits over the bottom of the pail and is held in position by springs with hooks on the upper ends, to hang on the rim of the pail.

On account of its large number of windmills, the Texas Panhandle is called the Holland of Texas. Here in many regions water in abundance is found anywhere from 30 to 65 feet. It is pumped into big storage tanks placed high enough above ground to serve as fire protection and to irrigate gardens.

SHOP NOTES

A CHEAP COMPASS.

To make this inexpensive compass all that is needed is a large cork (or rubber), a piece of stiff wire and a short pencil says American Miller. The wire should be about eight inches long and should be



bent to a right angle one inch from the end, and the end sharpened. The pencil is fitted vertically in the cork (or rubber), and the latter clamps the wire tightly and may be moved in or out to make a small or large circle, as desired.

HEAT ASSISTS RECOVERY OF OVER-STRAINED STEEL.

Wrought iron and steel which have been overstrained will quickly recover if exposed for a short time to a temperature of 212 degrees. The Physical Review reports some experiments in proof of this, in which samples of bar iron and boiler plate were overstrained and then kept for six weeks in a temperature constantly at freezing point. Tests showed a total arrest of recovery during that time. Upon being placed in a room of ordinary temperature recovery began slowly, and the former elasticity was secured in four hours, where the permanent extension did not exceed 3 per cent. Iron recovers from overstrain much more rapidly than steel.

TREATMENT OF BURNS FROM HOT WATER OR STEAM.

When a man is burned with hot water or steam of course the first thing to do is to send for medical assistance, but in the interim the injured man's clothing should be removed, and bandages soaked with sweet oil and lime water should be lightly applied to the burned parts. If steam has been inhaled, sweet oil should also be swallowed by the patient in considerable quantity, as it will soothe such of the burned parts as it can reach, says the American Electrician.

Sweet oil and lime water should be kept about every steam plant, to provide for contingencies of this sort. Cooking soda (saleratus) is also very soothing when applied to burns, and castor oil in moderate quantity may be given internally in the place of sweet oil.

"Automaniac" is suggested as a fitting name for automobile scorchers. "Autotojail" would be even better.

ORIGIN OF WORKSHOP WORDS.

If one would study the history of nearly all the common terms used in describing our tools and many workshop processes he would find the names were taken on account of the strong resemblance to common and well known objects. In Railway Machinery W. H. Sargent describes some of these and illustrates a few.

CONNECTING PIPES WITH RIGHT AND LEFT COUPLING.

"While speaking of piping I thought of something today that I might have thought of years ago with profit," says a correspondent of The Engineer. "In connecting two pipes with a right and left coupling try the coupling on each pipe, and count the number of turns necessary to screw it on each one by hand. You generally find that the left hand one will require two turns more than the right hand. This is because the left hand dies are not used as much as the right hand, and consequently they cut a smaller thread.

"In order to have both ends of the coupling make up the same, the end of the coupling that screws on the pipe farthest should be started first and given as many turns as is necessary to equal the difference between the number of threads employed at each end. This should be done before starting it on the end of the other pipe. For instance, if the coupling covers twelve of the left hand threads and only nine of the right hand threads at the opposite end, then the end having the left hand threads should be started first and be given three turns before starting the end having the right hand threads. This will enable the coupling to be screwed up tight on both pipes at the same time."

TO MAKE CELLULOID NON-INFLAMMABLE.

A process of rendering celluloid non-inflammable has been patented. To 25 parts of celluloidine, dissolved in a sufficient quantity of solvent, are added 6 parts of chloride of magnesium dissolved in either alcohol or methylated spirit and three parts of pulverized pure asbestos. These constituents are worked into a paste and may be applied either during or after the process of manufacture.

WEIGHT OF BLOW ON AIR DRILL.

The blow struck by an air drill is usually figured at seventy-five pounds. The actual weight of the blow is not really known. The weight of the blow struck by a hammersman is greater than that struck by a power drill. The blow struck by a man is inversely proportional to the number of blows he strikes per minute. The faster the blow the less the weight.

WOODEN WHEELS FOR VEHICLES

The first essential is the proper selection of the timber. For heavy wheels there is nothing better than white oak for the spokes and felloes, while black birch is equally as good for hubs. The best light hubs are made from elm and locust, if obtainable; if not, second-growth white or black oak is a good substitute, says the Carriage Dealers' Journal.

Hickory has no equal for making either wagon or carriage spokes. In fact it is the only timber that can be successfully used where the spokes are one inch and under in size. Both hickory and white ash are used for bent rims, although the former is the better wood for the purpose.

The hubs of heavy wheels should be made from fine-grained wood, rather than heavy-grained second-growth. Some manufacturers make the mistake of using the latter, and the result is a hub that lacks solidity and splits easily. A hub made of fine-grained oak or birch, however, will seldom shell or split and holds the spokes much tighter.

Another important point in hub making is that the center be as near as possible on the line of the pith, and that there be no knots to make cross-grained layers. If attention is given to this point, the hub-band will shrink uniformly and maintain its circular form; whereas, if the center of the hub is not near the line of the pith the band will, when seasoned, be more or less flattened on one side.

White oak is the best wood known for heavy spokes. It has great strength and rigidity. The latter is one of its most valuable characteristics, and in this respect it is superior to hickory where elasticity is not an element of strength.

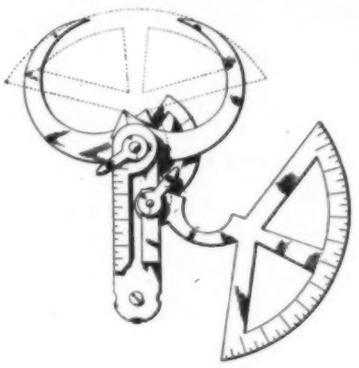
The goodness of a spoke depends on how it is cut from the log. It should always be split, not sawed, and cut in such a way that the grain layers will cross the bolt when the spoke is rounded. One reason for cutting a spoke in this way, is that wood shrinks less in the direction of the growth rings that cross them. Then, too, a spoke cut in that way is much stiffer than one cut with the grain layers running in the other direction. Another point to be observed is to have the face of the spoke on the side nearest the sap, as the spoke will resist greater strain if so made than if the face is on the heart edge.

In selecting spokes care should be exercised to group those of each quality together. A wheel made of a mixture of qualities, including first, second and third qualities, will not wear as well as one made of all seconds or even thirds.

Tin makes an excellent filling for teeth, and has been used more or less by dentists for 120 years.

COMBINATION MEASURING INSTRUMENT.

The use of this device will be readily



understood from the illustration. It is the invention of Richard Barr, Ravine, Pa.

BIG EARNINGS OF THE STEEL TRUST.

A statement of the earnings of the United States Steel Corporation for the quarter ending June 30, shows: Earnings for April, $12,320,766; for May, $13,120,930; for June, $12,250,000, making a total of $37,691,696, against $26,362,000 for the same period last year. This statement shows an increase of net earnings for the quarter of $11,329,696. The regular quarterly dividends were declared of 1¾ per cent on the prefered stock and 1 per cent on the common stock. Part of the increased earnings are due to the acquisition of the Shelby Tube Company, taken over by the corporation since last year. The total net earnings for six months, from Jan. 1 to June 30, were $65,407,153. After paying $9,120,000 interest and crediting $6,795,456 to the sinking fund, there remained a balance for dividends of $48,490,697. After payment of dividends there was left an undivided profit account for the six months of $220,463,623.

REPAIRING A STEAM PIPE.

The pipe was a 5-foot section of 12-inch main steam pipe, carried in a trench under the engine room floor and had been neglected until the thread leak had developed a ⅜-inch hole. After numerous fruitless experiments J. H. Ryan in The Engineer tells how the leak was stopped, as follows:

"Our next attempt was something cheaper. We made a couple of patterns and had some castings made and finished as we wanted them. Their shape is shown in the sketches, Figs. 1 and 2, and the way they were applied to the pipe is shown in Fig. 3. One pattern did for both halves of the pipe clamp. The clamp was bored out 1-16 larger in the vicinity of the joints. This was to allow the clamp to slip over the packing without tearing it, as the clamp springs in a little when screwing it up, being bored out ⅛ inch larger than the pipe to allow for packing. When screwing up the clamp the two narrow thicknesses of packing were put in between the halves of the clamp, Fig. 1, to make it tighten squarely without springing in towards the pipe. When screwed up tight the openings at the joints were about 1-16 inch. The inside of the flange was bored out in grooves 1-22 inch deep, as shown in the drawing, Fig. 1, to allow the clamp to sink into the packing. When the clamp is bored out smooth the surface is so large that it is almost impossible to get any pressure on the packing. The clamp shown in Fig. 2 is for holding the other clamp up to the flange, three of the latter style being used. The thickness of this clamp is determined by the distance between the bolt heads on the flange. The set screw is put as close as possible to the face of the clamp, so that any tendency it has to tip the pipe clamp will tend to make it tighten on the inner face. I have forgotten the name of the packing we used, but it was a soft and tough one that would stretch

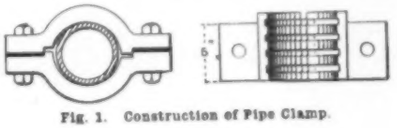
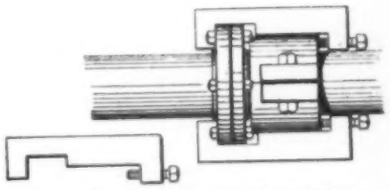


Fig. 1. Construction of Pipe Clamp.



Figs. 2. and 3. Application of Pipe Clamp.

and remain so. Instead of cutting the edge of the packing that was to be turned up against the flange we stretched it on that edge, and there was no V shaped openings to be filled. This clamp when applied was a perfect success, and the cost was trifling. The casting cost $2, machine work and bolts $7, and packing $1, making only $10 in all.

ANTIDOTE FOR AMMONIA FUMES.

Employes in ice and refrigerating plants are sometimes overcome by the fumes of the ammonia used in the work. In such case a good stiff drink of vinegar will help to counteract the action of the ammonia, revive the unconscious, and in many cases save life. If the victim is unconscious, it may be necessary to pry his jaws open to get the vinegar down.

An excellent method of keeping tomatoes off the ground is given in the California Cultivator: Stout posts are driven at each end of the plot and coarse wire netting is stretched across about a foot above the plants while they are still young. They will grow up through the meshes and the vines and tomatoes will be held off of the ground. It also makes picking for the housewife easy, as the tomatoes are above the netting.

Summer Course in Easy Mechanics For Boys.

By Wilbert S. Drew.

[This series, commenced in issue of June 28, will continue each week. It will give instructions which any boy can understand, how to use carpenter's tools and make things. In doing this only a few tools will be required, and cost of material will be small. The articles to be made will include a boat, table and similar subjects.]

BUILDING A CANVAS CANOE.—II.

The stem and stern posts are shown in Fig. 4 and are marked S. A, B, C and D are the parts of the mold over which the posts are bent. The bottom part A, may be made of two or more pieces of inch board, held together by cleats nailed to its under side and the pieces B, C and D are also of inch board, nailed to the top of A. A row of 5/8-inch holes is bored in the lower board A, one inch from the edge of the upper boards as shown and each hole is provided with a nicely fitting pin of hard wood about 3 inches long and slightly tapered. These parts must all be laid out full size before making them as explained in the last article.

It will be well to make these posts 4 or 5 inches longer than

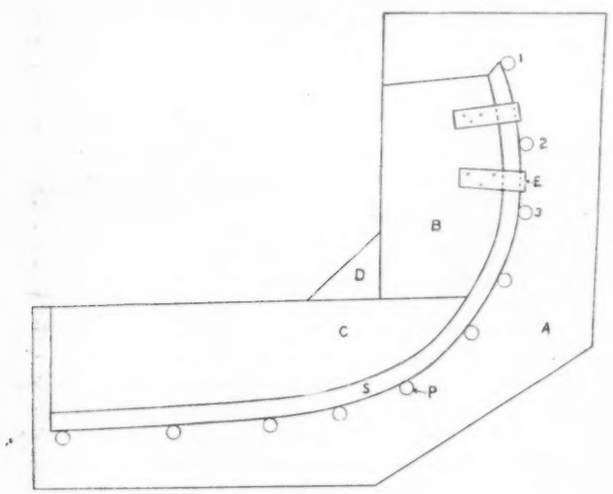


Fig. 4.

the finished dimensions and then cut them to the correct size after bending. Several blocks E should be nailed to the boards B and C, as shown and thin pieces provided to place between them and the posts in order to keep the latter from twisting.

Having prepared the mold, put one of the posts in the steam box, fill the can half full of water and steam the piece until it is very flexible; then remove it from the steam box, and having removed all the pins from the mold except the first one, marked 1 in the drawing, insert the end of the post between board B and this pin; then bend the post against the mold until the second pin can be inserted, etc., until all the pins are in place and at the same time see that the piece lies flat against board A and insert wedges under the blocks E to keep it in that position. Now set the mold away with the post in it and leave it until the latter is thoroughly dry, when the other post may be bent in the same way after removing the first one.

When the stem and stern post are dry put them in place as shown in the sketch, cutting out notches from molds 1 and 8 to receive them and fasten the upper end, or as the canoe is built upside down, it may be termed the lower end for the time being, by passing it through a rectangular hole cut in a piece of board and nailing this piece to the two long boards that support the molds.

The next step is to cut the sides of the stem and stern posts to the correct shape. This shape varies constantly throughout the length of the posts. Lay out a line down the center of each post and a pair of lines, one each side of the center line and 1/8 inch from it. This gives the width, 1/4 inch, of the posts along their outer edges. They are to be left full thickness on the inside. Cut away the superfluous stock very carefully, using a chisel and small plane and frequently test the work as the cutting proceeds by trying on a strip of siding, which should be held down against the molds in the position it is to take in the finished work and see if the post is assuming the correct shape. The strip should lie fairly on the molds and the post should make a snug joint with it when in position.

When the posts have both been correctly shaped the siding is next put in place, the ends cut flush with the outer edges of stem and stern posts and tacked lightly in position. The streaks may be bent sidewise or twisted, but they must not be sprung edgewise because this will cause the canoe sooner or later to pull out of shape. It will be well to fasten the streaks to the molds temporarily with small round-headed screws, but the fastenings at the stem and stern posts may be permanent. At these places small copper nails about 1/4 inch longer than the thickness of the parts they are to hold may be driven through and clinched against an iron block. It will be necessary to drill holes slightly smaller than the nails before putting them in.

The material for the ribs is clear straight-grained spruce, and they should be 5-16 inch thick, 2½ inches wide and spaced 1½ inches apart. Their inner corners are rounded over to a quarter circle.

Copper tacks 3/4 or 7/8 inch long should be used for putting in the ribs. The tacks are driven through from the outside against a heavy hammer or block of iron held against the rib on the inside by an assistant; this turns the point of the tack over into a loop, the point re-entering the wood and making a very strong fastening. Two tacks, one through each edge of the streak, are used at each rib.

The ribs are first steamed until very soft and pliable, when they are removed from the steam box, bent into shape with the hands and quickly tacked into place. They should be left a few inches too long and sawed to length after they are in position. It will be found that the ribs near the stem and stern cannot be bent sharply enough without breaking. These must be made in two pieces and their lower ends fastened to the stem and stern posts. Put in as many of the ribs as possible without interfering with the molds, then loosen the molds from the two boards to which they are fastened and turn the canoe over. Remove the molds, one at a time, by taking out the round headed screws and finish putting in the ribs, whose ends are then sawed off even with the top of the canoe.

See that no nail heads project by even a small amount on the outside, as they would soon cause holes to wear through the canvas; and go all over the outside carefully with coarse sand paper held over a block, leaving the entire outer surface of the streaks perfectly smooth. This precaution is very important as any such projections would not only look bad, but would cause the covering to wear away at those points.

Now give the wood a good coat of linseed oil, outside and in, applying the oil with an ordinary paint brush. This will add greatly to the durability of the wood and decrease its tendency to warp when it gets wet.

These articles on Canoe Building will be finished in next week's issue.

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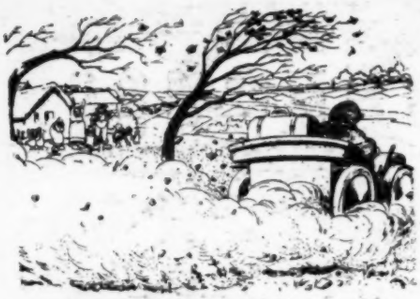

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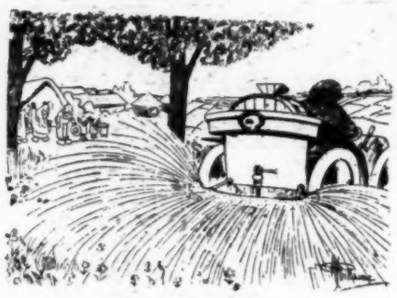

The solution of the problem

CORRESPONDENCE.

FORTUNES IN PLANTING TREES.

To the Editor:—In your excellent magazine I was interested in your suggestion "A Fortune in Planting Trees." What kind of soil is specially adapted to the black walnut, which was the variety you recommended?"

Reply by Wm. L. Hall, Chief Bureau of Forestry, U. S. Dept. of Agriculture.

The natural range of the black walnut is from western Massachsetts to southern Minnesota and eastern Kansas and south as far as Florida and Texas. Its range for economic planting is on fertile river bottoms throughout the Carolinas, Georgia and Tennessee, and in the Ohio and Mississippi valleys, as well as on river bottoms in eastern Nebraska, Kansas and Oklahoma. The soil best suited for the growth of the walnut is deep, fertile alluvium, containing a large quantity of humus. It prefers a porous subsoil, and both soil and subsoil should be well drained. The hot winds of summer sometimes injure it in the southwestern plains states, and the cold of winter is apt to kill it back in Minnesota and the Dakotas.

The walnut in a good soil is a rapid-growing tree. The trees sometimes attain a height of 100 feet and a diameter of from 4 to 6 feet. When grown in open ground, however, it forms a round crown and branches profusely. If planted thick, either in pure or mixed stand, it forms a tall, straight trunk free from limbs and valuable for economic uses. As the tree advances in years, its rate of growth decreases and the larger part of the sapwood is transferred into the much more valuable, dark-colored heartwood. To fully mature its wood, the walnut requires a growth of from 80 to 100 years. The walnut reproduces readily from seed. A plantation usually should be started from seed planted on the site where the trees are to grow, as the seedlings are not easily transplanted. The seed should be gathered and hulled as soon as mature, and, after drying for a few days, should be planted or else stratified in layers of sand, where it will be exposed to freezing. If stratified, it is a good plan to leave the nuts in the sand the following spring until they begin to sprout. The sprouted nuts should then be taken up and carefully planted where the trees are to stand. In this way one avoids planting the nuts which do not sprout, and can make sure of a stand.

The walnut is a light-demanding tree. It is a valuable tree to grow in pure plantations. If a mixture of species is desired, it may be associated with such trees as the elms, oaks, locusts, ashes, red cedar, hardy catalpa and osage orange. Some of these serve an excellent purpose in pruning the side limbs from the walnut, giving it a tall, straight trunk. The walnut will bear crowding when young, but care should be exercised in mixing it with rapid-growing species not to allow it to become overtopped. As the natural supply of walnut is becoming scarce, the demand for this lumber in the future must be largely supplied by planted timber.

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SPINNING THE THREAD OF LIFE.

The "Thread of Life," herewith illustrated, is another of the interesting statuary groups that is to adorn the Textiles building at the St. Louis World's Fair. It is a companion group to "The Flight of Time." The winged figure of Fate, in this, corresponds to Father Time, and the wheel of fortune takes the place of the hour glass. These two groups are to occupy positions at the two sides of the great central doorway. The symbolic idea of Time is so interwoven with that of Spinning that the two seem almost inseparable.

LOBSTER NOT A FISH.

The great French naturalist, "Cuvier," once asked a student: "What is a lobster?" Answer: "A red fish that walks backwards." "You are quite right," commented Cuvier, "except in three small particulars: it is not a fish, it is not red and it does not walk backward."

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